BEFORE THE SECRETARY OF THE INTERIOR

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PETITION TO LIST ALLRED'S FLAX (*LINUM ALLREDII*) UNDER THE ENDANGERED SPECIES ACT

CENTER FOR BIOLOGICAL DIVERSITY

December 4, 2025

NOTICE OF PETITION

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Pursuant to Section 4(b) of the Endangered Species Act ("ESA"), 16 U.S.C. § 1533(b); section 553(e) of the Administrative Procedure Act (APA), 5 U.S.C. § 553(e); and 50 C.F.R. § 424.14(a), the Center for Biological Diversity ("Center") hereby petitions the Secretary of the Interior, through the U.S. Fish and Wildlife Service ("FWS" or "Service"), to protect Allred's flax (*Linum allredii*) as a threatened or endangered species. The petitioner also requests that critical habitat be designated concurrently with the listing, pursuant to 16 U.S.C §1533(a)(3)(A) and 50 C.F.R. §424.12.

FWS has jurisdiction over this petition. This petition sets in motion a specific process, placing definite response requirements on FWS. Specifically, the Service must issue an initial finding as to whether the petition "presents substantial scientific or commercial information indicating that the petitioned action may be warranted." 16 U.S.C. § 1533(b)(3)(A). FWS must make this initial finding "[t]o the maximum extent practicable, within 90 days after receiving the petition." *Id.*

The Center is a national, nonprofit conservation organization with more than 1.8 million members and online activists dedicated to the protection of endangered species and wild places.

Submitted this 4th day of December 2025

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I. EXECUTIVE SUMMARY

Allred's Flax (*Linum allredii*) is a critically imperiled plant endemic to a small area of the Permian Basin in New Mexico and Texas. The main threat to this species' existence is oil and gas development in the nation's largest oil producing region. In New Mexico, most of the species' known, and potentially suitable, habitat coincides with oil and gas leases that are or could be developed. Many confirmed occurrences are located within just a few miles of existing wells. In Texas, the number of confirmed occurrences is unknown, but a large proportion of the potentially suitable habitat has active oil and gas leases. Direct effects on Allred's flax from oil and gas activities may include habitat loss and degradation due to the construction of wells and associated infrastructure, while indirect effects may include dust emissions from roads covering the plants and invasive species spread. In addition to oil and gas development, Allred's flax is threatened by livestock grazing, herbicide treatments, mining and climate change. This species urgently needs the protections afforded by the Endangered Species Act.

II. INTRODUCTION

The Chihuahuan Desert is home to a great richness of species; 3382 species are reported, of which 826 are endemic to the region (Zavala-Hurtado and Jiménez, 2020 as cited in Juárez-Morales et al. 2023, p. 9). Part of this endemism can be attributed to the presence of widespread but localized gypsum deposits which give rise to at least 200 suspected endemic taxa (species or varieties) in the greater Chihuahuan Desert region (Moore and Jansen 2007, p. 392).

Allred's Flax *(Linum allredii)* is a gypsophile (BLM 2018a, p. 3-5), restricted to the northern Chihuahuan Desert's "Gypsum Plain"— an outcropping of Permian-aged Castile Formation located between the Guadalupe and Delaware Mountains on the west and the Pecos River in New Mexico and Rustler Hills in Texas on the east (Sivinski and Howard 2011, p. 3 and references cited therein). As a narrow endemic confined to gypsum substrates, it is unlike the vast majority of North America's *Linum* species, which are wide-ranging (Sivinski and Howard 2011, p. 1). *L. allredii* can be distinguished from its closest relative, *Linum puberulum*, based on its suffrutescent habit, glabrous upper stems and upper leaves, and yellow petal bases (Ibid, p. 1).

Due to the coincidence of the Gypsum Plain with vast oil and gas reserves, *Linum allredii* faces significant threats from oil and gas development. Most of the species' known, and potentially suitable, habitat in New Mexico coincides with oil and gas leases that are or could be developed, with many confirmed occurrences located within just a few miles of existing wells. In Texas, the number of confirmed occurrences is unknown but active oil and gas leases cover a large proportion of the potentially suitable habitat. Effects on *L. allredii* from oil and gas activities may include habitat loss and degradation due to the construction of wells and associated infrastructure, dust emissions from roads covering the plants, and invasive species spread. In addition to oil and gas development, *L. allredii* is threatened by livestock grazing, herbicide treatments, mining and climate change.

Without adequate protection against oil and gas development and other threats, *Linum allredii* is at risk of going extinct.

III. NATURAL HISTORY

A. Taxonomy and Description

Linum allredii was described by Sivinski and Howard (2011, entire). A long-lived suffrutescent perennial flowering plant of the Linaceae family in Linum series Rigida, it grows to a height of approximately 25cm from a woody branching base and produces orange flowers along with thick lateral roots. *L. allredii* has the ability to reproduce asexually by sprouting shoots from its lateral roots up to three meters from the main plant body. *L. allredii* is named for Kelly W. Allred, outstanding floristic botanist, agrostologist, bryologist, teacher, and expert at finding and cataloging the plants of New Mexico during his long career as professor of botany in the Animal and Range Science Department at New Mexico State University in Las Cruces (Ibid, p. 3).

B. Habitat and Ecology

Linum allredii was described by Sivinski and Howard (2011) from Yeso Hills, a small northern portion of the Gypsum Plain (Figure 1) (Sivinski and Howard 2011, p. 3), which, as discussed above, represents the surface exposure of the Permian-aged Castile Formation located between the Guadalupe and Delaware Mountains on the west and the Pecos River in New Mexico and Rustler Hills in Texas on the east (Sivinski and Howard 2011, p. 3 and references cited therein). The Gypsum Plain is further described by Stafford et al. 2018 as being located on the northern edge of the Chihuahua Desert, with an average annual precipitation of 267 mm that primarily occurs as late summer monsoonal storm events (Sares, 1984 as cited in Stafford et al. 2018, p. 293-294). However, decadal-scale rain events may occur within the area contributing more than 100 mm of precipitation over broad areas within less than 48 hours (Stafford et al., 2017a as cited Stafford et al. 2018, p. 294). Temperatures during the year average 17.3°C, with a low of 9.2°C and a high of 25.2°C (Sares, 1984 as cited in Stafford et al 2018, p. 294).

According to Sivinski and Howard (2011), *Linum allredii* appears to be a gypsophilic endemic of the scarps, gypsum hills, and swale/canyon margins of the Gypsum Plain. The species is further noted to be limited in distribution to those topographic features that expose a layer of pale, sandy, biologically crusted gypsum that is much lighter in color than the gray more heavily crusted gypsum of adjacent strata (Sivinski and Howard 2011, p. 3). Population densities in the Yeso Hills are reported to range from a few dozen plants on hillside habitats to several thousand individuals along narrow outcrops of pale gypsum exposed by long scarps (Sivinski 2011, p. 2).

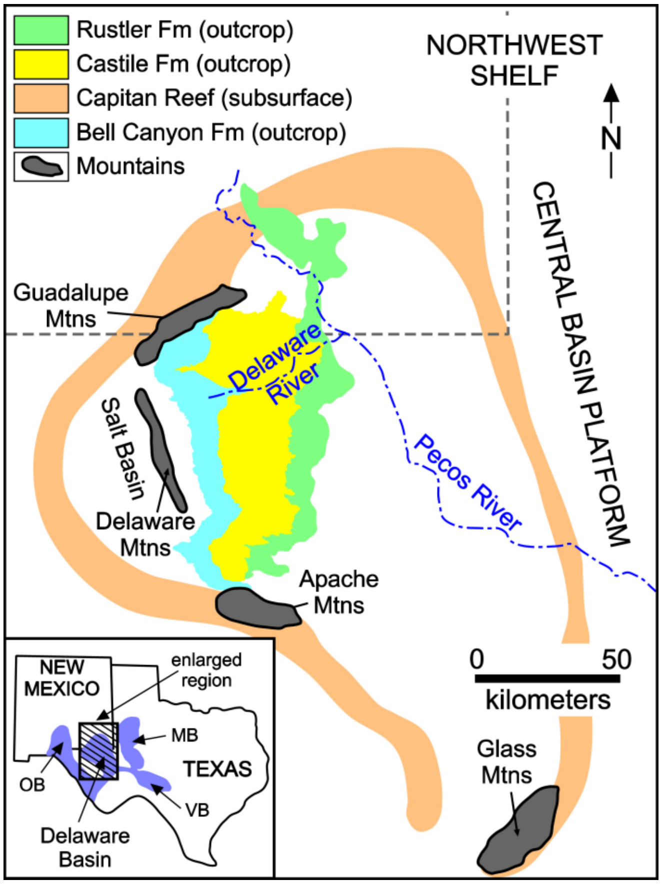

Figure 1. Location map of the Delaware Basin and Gypsum Plain, including outcrops of relevant lithologic units and major geology and hydrologic structures from Stafford et al. 2018 (p. 294) (adapted from Stafford, 2017 cited therein). Inset map depicts relationship of study area to West Texas, New Mexico and the greater Permian Basin including the Delaware Basin, Orogrande Basin (OB), Midland Basin (MB) and Val Verde Basin (VB) (Stafford et al. 2018, p. 294).

IV. RANGE AND STATUS

Linum allredii is restricted to the Permian Castile Formation of the Chihuahan Desert ecoregion southwest of Carlsbad Caverns/White City, at about 3,900 ft (NMRPTC 1999 as cited in Roth 2020, p. 8). As of 2020, all known occurrences were from within the Yeso Hills portion of the Castile Formation/Gypsum Plain (Howard 2019 as cited in Roth 2020, p. 8), the same area that *L. allredii* was described from about a decade prior. The known population was described as comprising two general population segments; one in southern Eddy County, New Mexico, and one in adjacent Culbertson County, Texas (Roth et al. 2020, p. 8-9). The total area covered by the populations was given as approximately 10,000 acres, primarily in New Mexico, but including large areas of non-habitat (Ibid, p. 9). Total known occupied habitat was estimated to be 1,250 acres, with a Bureau of Land Management (BLM) model developed for use in NEPA analyses giving the "total area of the model predicted habitat" as 23,221 acres (Ibid).

The latest habitat suitability model for *Linum allredii* (also developed by the BLM) is shown in Figure 2. The most suitable habitat is predicted to occur in the Yeso Hills area, mostly on BLM land. Based on personal communications with the BLM (April 2024) and the New Mexico Energy, Minerals, and Natural Resources Department (EMNRD) (February 2025), habitat in Texas may be more extensive than what is shown in the model, and may include the entire area from the New Mexico/Texas border to about Virginia Draw[1]. However, as can be seen from Figure 2, this still represents a limited amount of habitat overall, and because habitat in Texas side is privately-owned, further survey and documentation of *L. allredii* may never occur there (Roth 2020, p. 9), and habitat conservation cannot be guaranteed. Moreover, much of the potential habitat in Texas is leased and/or developed for oil and gas (see section V). Other threats to *L. allredii* include mineral extraction, livestock grazing, herbicide applications, recreation (Roth 2020, p. 10-11), and climate change.

There is no readily available population trend data for *Linum allredii*. This species is ranked as critically imperiled (G1) by NatureServe (NatureServe 2019, p. 1). The New Mexico Rare Plant Conservation Strategy categorizes *L. allredii* as "weakly conserved" due to documented and potential threats, and a very limited distribution (EMNRD-Forestry Division 2017 as cited in Roth 2020, p. 9).

[1] Virginia Draw corresponds to roughly the southern end of the species' modelled range, as shown in Center for Biological Diversity 2025 (entire). The latter depicts the habitat suitability model shown in Figure 2 but with the location of Virginia Draw shown explicitly.

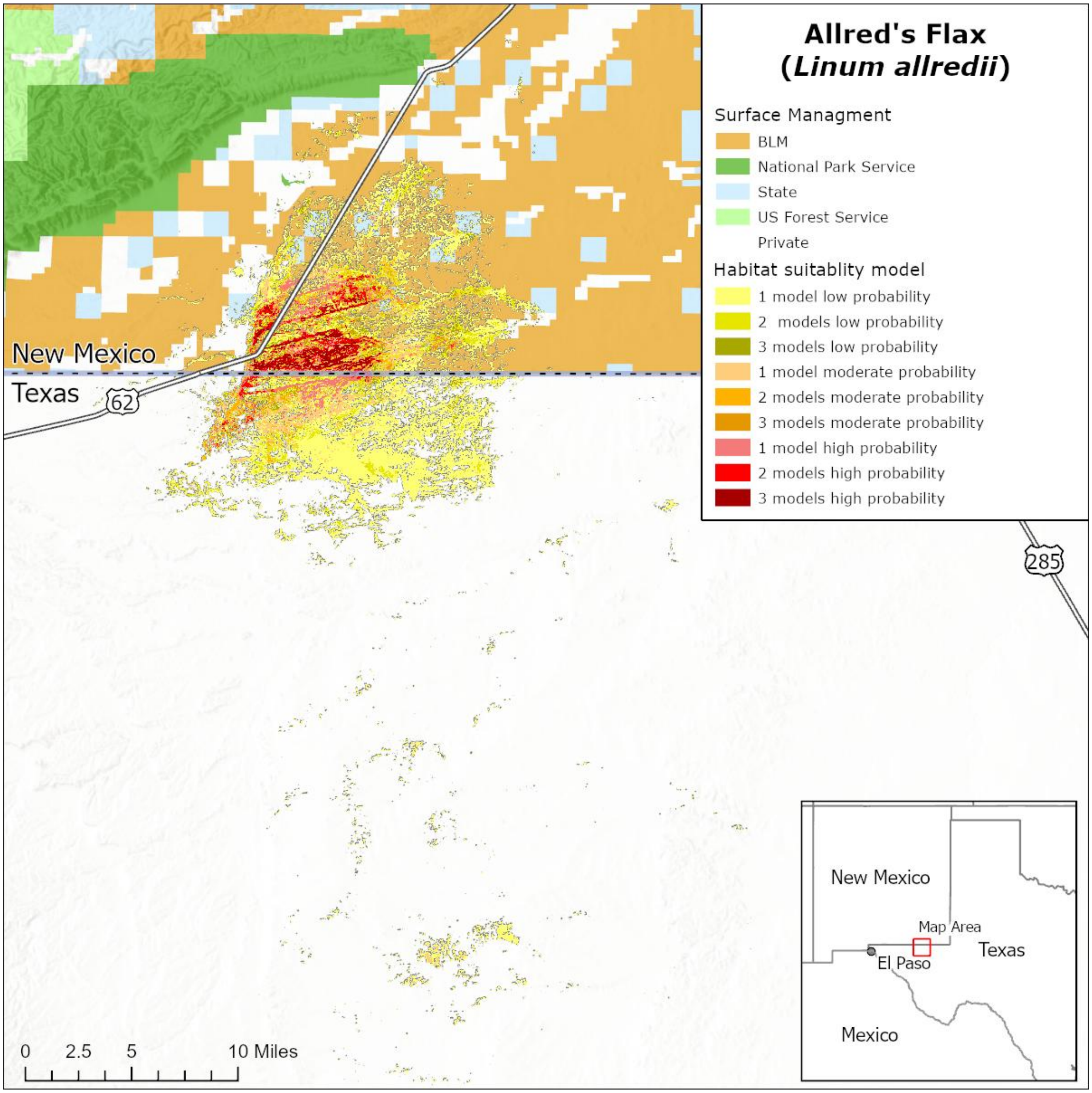

Figure 2. Most recent BLM habitat suitability model for *Linum allredii* (NatureServe and Heritage Network Partners 2021). Shared by the BLM/EMNRD in April 2024. Least suitable habitat is shown in yellow and most suitable habitat in red. Also shown is the land ownership in the area[2].

[2] "BLM [Bureau of Land Management]. 2024. BLM AZ Surface Management Agency. Published January 2024. Available at: https://gbp-blm-egis.hub.arcgis.com/ (accessed 23 January 2025)".

V. THREATS

A. Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range

1. Oil and Gas

The largest threat to the continued existence of *Linum allredii* is oil and gas development in the Permian Basin, the nation's largest oil producing basin (U.S. EIA 2023, entire), and specifically the Delaware sub-basin, which is reported to have immense quantities of oil and gas (Palmer 2022, p. 2). In 2020, it was estimated that 88% of modelled habitat on BLM land was being leased for oil and gas development (Howard 2019 as cited in Roth 2020, p. 10), and that development of wells continued to occur within modelled habitat (Roth 2020, p. 10). The ability to protect natural resources from oil and gas development is described in Roth (2020) as extremely limited because leasing grants a property the right to develop with policies severely limiting the ability of the agency to deny or move activities or facilities more than 200m unless protective stipulations are in place when the lease is issued (Roth 2020, p. 9). The BLM was also reported to be "proposing to establish dedicated 300 ft wide right-of-way corridors supporting oil and gas development within the modelled habitat of *L. allredii* extending more than 24 miles and causing approximately 414 acres of total disturbance" (Ibid, p. 10). Portions of the proposed corridors cross occupied and potential habitat, and if constructed, will significantly disturb the type locality of *L. allredii* (Ibid).

Analysis of current oil and gas data shows that virtually all of the modelled habitat in New Mexico as shown in Figure 2, coincides with BLM leases that are either active or have some other status that does not preclude future development (Figure 3). Numerous new or active wells are also found on the landscape (Figure 4). Included in the leased habitat are additionally most of the occurrences identified in the 2011 paper describing *Linum allredii* (Figure 5). A small portion of the modelled habitat (and of the modelled highly suitable habitat) in New Mexico has leasing restrictions issued by the New Mexico State Land Office (SLO) (Figure 6). However, a leasing restriction can have different meanings (SLO, personal communication, March 2025), and based on examination of individual data points in the restrictions dataset shown in Figure 6, most of the restrictions in this case appear to be related to the Texas Hornshell Candidate Conservation Agreement with Assurances (CCAA). Based on information provided by the SLO (personal communication, March 2025), this restriction only applies to new leases, and while a lease could theoretically be withdrawn, or land excluded from the lease, this is at the discretion of the SLO.

In Texas, a large proportion of the modelled habitat, and areas not modelled but which may be suitable (see above), coincide with active oil and gas leases. There are also numerous wells (Figure 4).

The U.S. Energy Information Administration (EIA) forecasts that crude oil production in the Permian basin will increase from 6.3 million barrels per day (b/d) in 2024 to 6.6 million b/d in 2025, and similarly that marketed natural gas production will rise by 1.0 billion cubic feet per day (Bcf/d) in 2025 to average 25.8 Bcf/d (U.S. EIA 2024, p. 4). Additionally, it is likely that the area will experience an increase in oil and gas activities under the current administration given that the executive order titled "Unleashing American Energy" declares "It is the policy of the United States […] to encourage energy exploration and production on Federal lands and waters" (The White House 2025, p. 1).

Oil and gas production involves the drilling of wells, and as described in Roth (2020), infrastructure supporting production can be extensive and includes roads, powerlines, pipelines, work, and storage areas (Roth 2020, p. 10). The clearing of land associated with infrastructure construction may cause direct mortality of plants, and the loss of vegetative cover lead to erosion of gypsum soils (BLM 2018a, p. 3-5):

> In gypsum soils, the organic matter content is low and the vegetative cover is sparse, which leads to rapid runoff and a decrease in water-holding capacity. Plant roots are limited by salinity and the gypsiferous layer close to the surface; these soils are subject to severe erosion if the vegetative cover is lost. Therefore, gypsum soils are highly sensitive to disturbance and difficult to reclaim if impacted.

The survival of *Linum allredii* directly depends on the existence and health of gypsum soils (BLM 2018a, p. 3-5).

At the exploration stage of oil and gas development, seismic exploration may also be conducted that involves the use of large off-road vehicles driving in extensive gridded patterns (Roth 2020, p. 10). Moreover, survey crews that survey new facility locations (such as well pads) are described as usually driving off-road (even in closed areas), thus creating some resource disturbance and the potential for unintended establishment of new roads later used by recreationists (Ibid). As described in Taylor (n.d.) in reference to off-road vehicle activity, the rolling of wheels can cause soil compaction, which can in turn decrease water infiltration, increase runoff, and cause severe erosion problems (Taylor, n.d., p. 3). Another potential effect of motor vehicle activity, both on designated roads and off-road, is increased dust emissions. According to Roth (2020), an effect noted in oil and gas areas is dust emissions from roads covering plant resources within a few hundred feet of active roadways (Roth 2020, p. 10). The presence of dust could potentially impact pollination success (see section E).

Increased traffic due to off-road vehicles, trucks and heavy equipment additionally increases the likelihood of introduction of invasive plant seed and vegetative propagules (Barlow et al. 2017, p. 3). This increased propagule pressure combined with disturbance associated with infrastructure construction may accelerate invasive plant spread (Ibid). In their study of unconventional gas development in Pennsylvania forests, Barlow et al. 2017 found that 61% of well pad sites surveyed had 1 invasive plant species and 19% had 3 species. The main drivers of invasion were propagule pressure, dense road networks, and heavy traffic (Barlow et al. 2017, p. 1-2).

In BLM's Carlsbad Field Office (CFO) planning area (which coincides with *Linum allredii* habitat in New Mexico), some invasive plants are observed to be spreading or increasing in density, in some areas, especially in oil and gas fields, interstate corridors, and some watersheds (BLM 2018a, p. 3-21[3]). This observation may be due to the prevalence of oil and gas development in the region as well as the fact that oil and gas development may spread invasive species more than other industries due to the use of equipment transported from various locations, the spatial extent of the infrastructure, and frequent development on rural or undeveloped land (Texas Water Resources Institute 2016, p. 2). Invasive plants are a threat to *L. allredii* due to being a potential source of competition for resources, with many also highly fire adapted, burning quickly and growing back faster than most native species after fire (Ibid, p. 2).

Finally, oil and gas infrastructure may cause habitat fragmentation. This is a concern as, although the reproductive biology of *Linum allredii* is not well-known, a recent study of over 150 plant species is reported to have shown that, overall, progeny sired in fragmented habitats have decreased genetic diversity and outcrossing rates, and increased inbreeding and correlated paternity, except for vertebrate-pollinated plants. It is also reported that the study shows progeny generated in fragmented conditions having, on average, lower vigor than progeny sired in continuous habitat (with no effects on vertebrate-pollinated plants) (Conservation Corridor 2019, p. 1).

[3] For a map of the BLM CFO planning area, see BLM 2018b, Map 2-2 on p. 12.

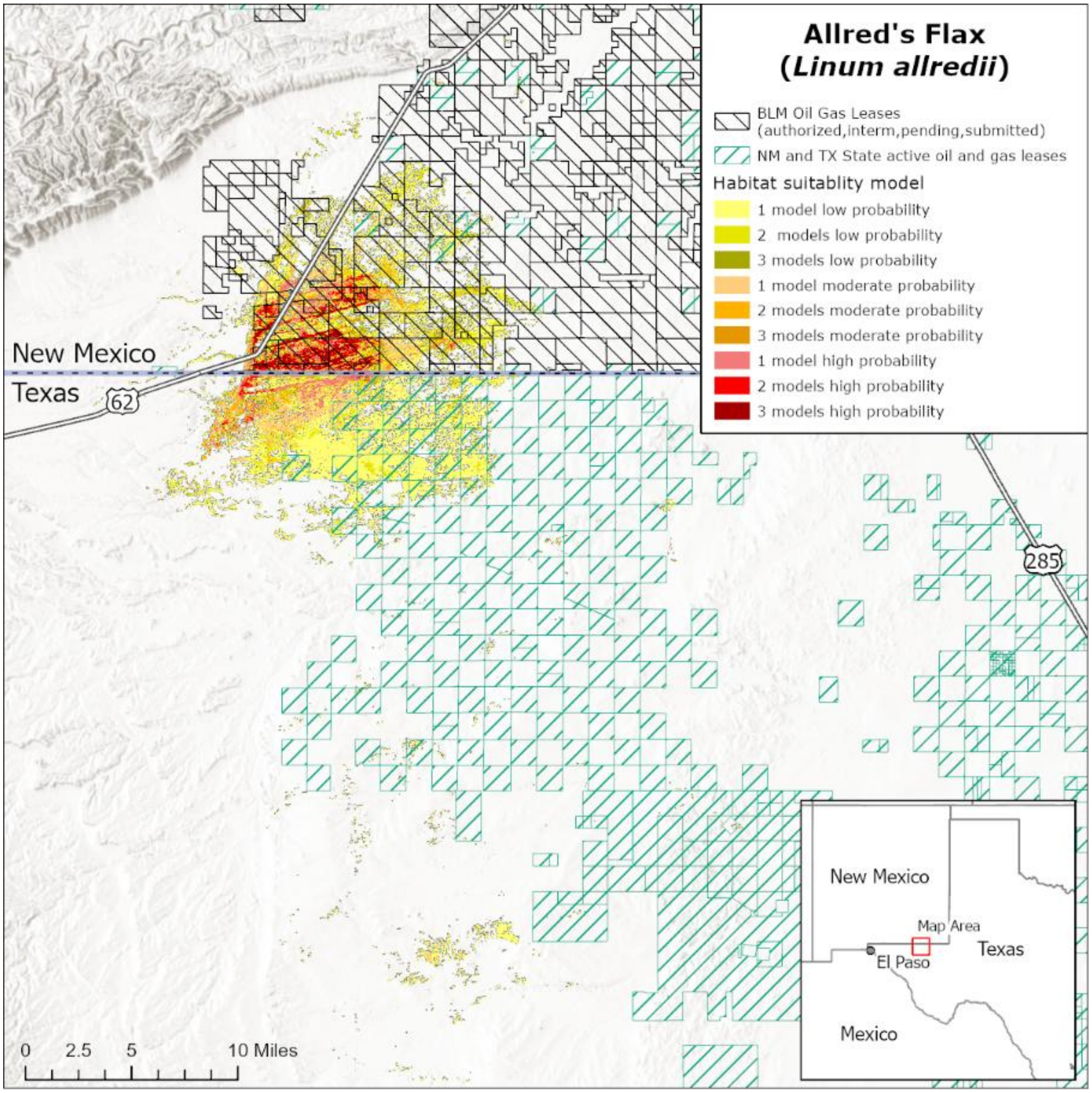

Figure 3. Oil and gas leases in modelled habitat for *Linum allredii*. Modelled habitat is as in Figure 2. Oil and gas leases correspond to BLM (New Mexico)[4] and state (New Mexico[5] and Texas[6]) leases.

[4] As shown in the "BLM Natl MLRS Oil and Gas Leases" layer found on BLM's geospatial download page at https://gbp-blm-egis.hub.arcgis.com/ (accessed March 2025).

[5] As shown in the "slo_ogleased" layer at the New Mexico State Lands Office at https://www.nmstatelands.org/maps-gis/gis-data-download/ (accessed March 2025).

[6] As shown in the "Active Oil and Gas Leases" layer at the Texas General Land Office website at https://www.glo.texas.gov/land/gis-maps-and-data (accessed March 2025).

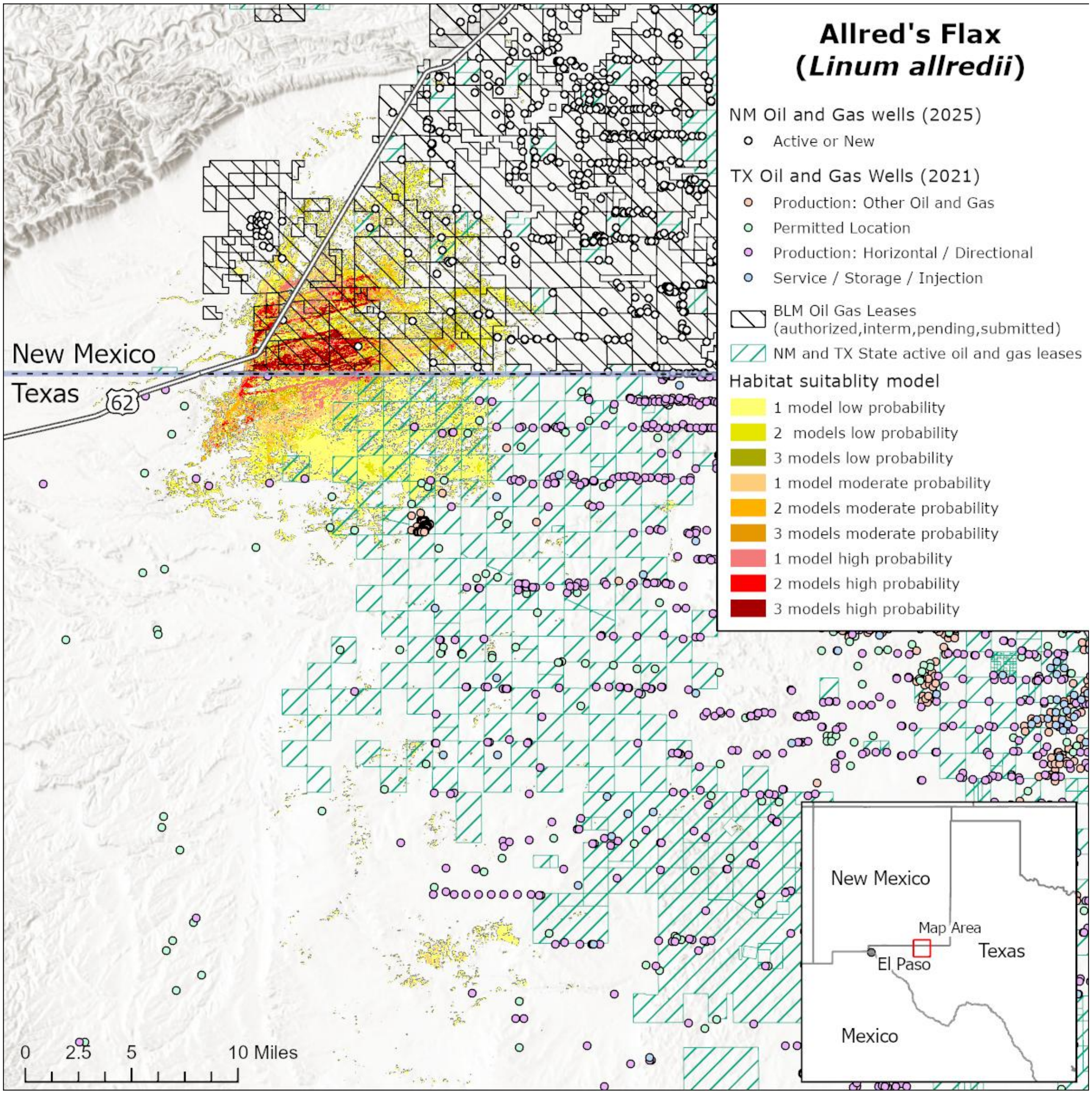

Figure 4. Oil and gas wells in modelled habitat for *Linum allredii*. Wells in New Mexico are from EMNRD[7] and wells in Texas are from the FracTracker Alliance[8]. The other information shown is the same as in Figure 3.

[7] "Oil and Gas Wells" layer on the EMNRD website at https://ocd-hub-nm-emnrd.hub.arcgis.com/ (accessed March 2025).

[8] map service on FracTracker Alliance's Texas Oil and Gas Viewer map at https://www.arcgis.com/home/webmap/viewer.html?webmap=6304a76feaa24d98b8eaecdcc0f9e4bc (accessed March 2025).

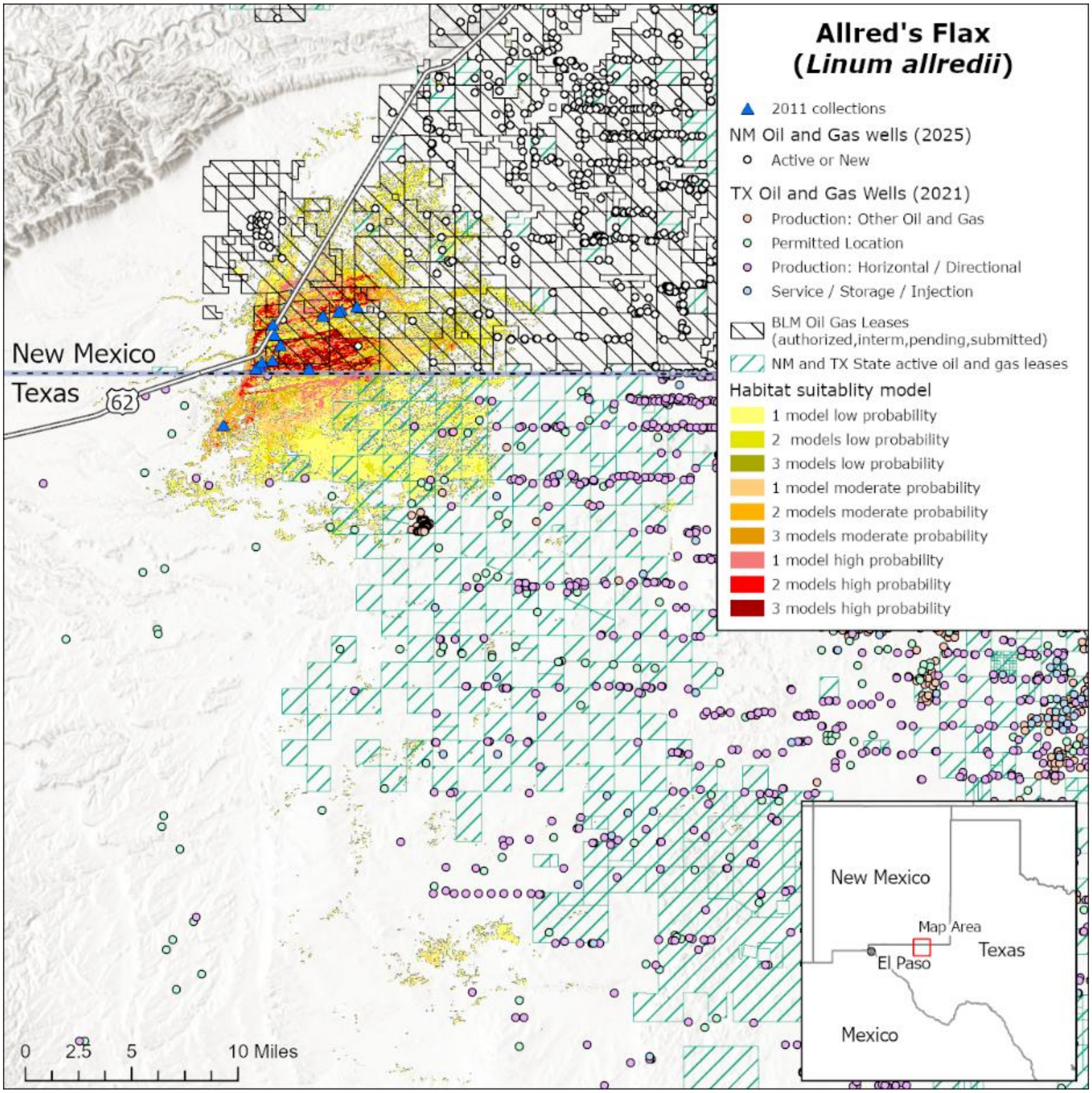

Figure 5: Distribution of *Linum allredii* as given in Howard and Sivinski 2011. The blue triangles represent the collection points included in Figure 2 in Howard and Sivinski (2011), p. 4, with the exception of one specimen (included in the cluster of 3 points at the southwest end of the New Mexico range) which was not included therein but is listed on p. 2 of the study (*Dunmire 1215* (UNM)). The other information shown is the same as in Figure 4.

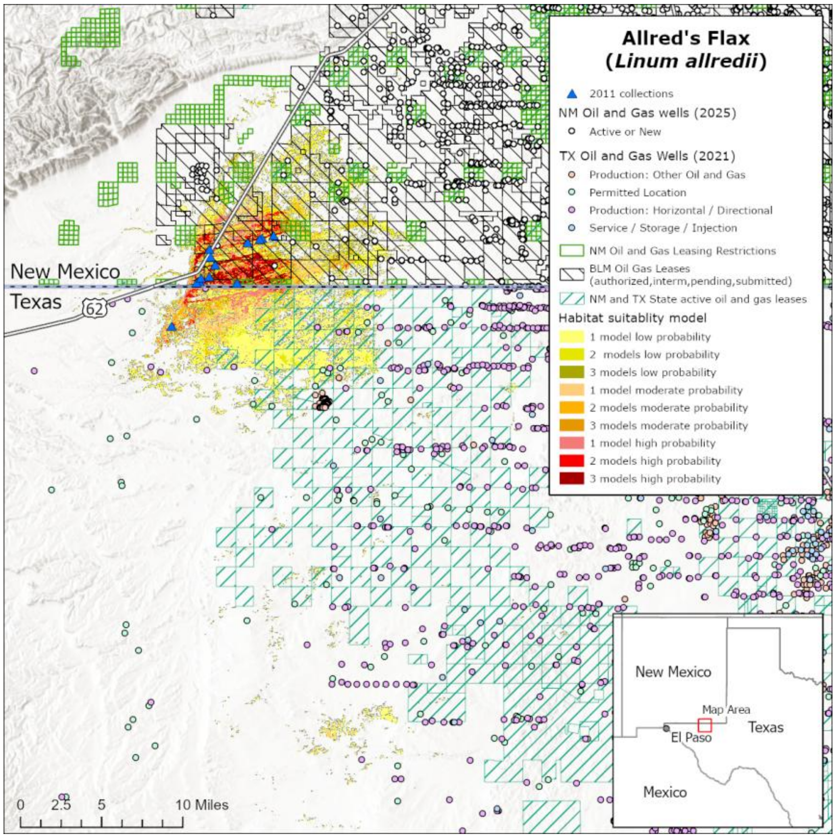

Figure 6: SLO oil and gas leasing restrictions. Data obtained from SLO[9]. The other information shown is the same as in Figure 5.

2. Livestock grazing

In an account written to support the addition of *Linum allredii* to New Mexico's endangered plants list (Roth 2020, p. 8-11), the EMNRD describes "grazing" as pervasive across the landscape, with many direct and indirect effects to plants and their habitat (Roth 2020, p. 10). The most severe impacts of this grazing, presumed here to mean livestock grazing, are described to occur near watering or corral facilities, with several of these facilities located within or near *L. allredii* habitat (Ibid). It is also noted that one instance of heavy grazing use of *L. Allredii* plants has been observed (Ibid). In the Draft Resource Management Plan/Environmental Impact Statement (RMP/EIS) for public lands managed by the BLM CFO (BLM 2018a, p. 1), most of the modelled *L. Allredii* habitat in New Mexico (Figure 2) would coincide with areas open to livestock grazing under both Alternative C (the preferred alternative) and the No Action Alternative (continuation of current management) (Ibid, p. ES-3, 2-36; BLM 2018b, p. 54, 57).

[9] SLO map service at https://mapservice.nmstatelands.org/arcgis/rest/services/Public/SLO_Active_Leases_t/MapServer/5 (accessed March 2025).

Effects of livestock grazing may include herbivory, soil compaction and increased erosion, trampling of vegetation, and the potential spread of noxious weeds and other invasive species through equipment, feed products, and on livestock themselves (BLM 2018a, p. 4-71).

3. Mining

Mining in the Castile formation is described in Roth (2020) as being focused on the development of economically viable deposits of gypsum and sulfur (Roth 2020, p. 10). While only one small, apparently inactive, gypsum mine is reported to occur within "modelled habitat", and sulfur mining only within the Castile Formation in Texas, "discovery of commercial deposits of gypsum, sulfur or unexpected other minerals could rapidly change the threat level" (Ibid). Moreover, it is not clear from Roth (2020) to what extent sulfur mining in Texas already coincides with the area of potential habitat for *Linum allredii*.

Based on BLM mining claims data mapped by the Claims Location Array Interactive Map Service, there are two active lode claims within the main area of modelled suitable habitat in New Mexico, both located in 2010[10] (Figure 7). That general location also appears to coincide with a mining plan for a small calcium, sulfate-gypsum extraction operation[11]. Multiple lode claims were additionally located in 2023 less than 10 miles north of the main habitat area in New Mexico[12].

Mining is a threat to *Linum allredii* for much the same reasons as oil and gas development (see section 1): it may lead to the direct mortality of plants during excavation, crushing of plants and soil compaction due to heavy equipment use, erosion due to loss of vegetative cover and soil compaction, and dust emissions. BLM 2018a (p. 3-20) further notes how invasive plant infestations in BLM's CFO planning area "begin as small patches in disturbed areas, such as […] mining operations".

[10] Based on information available on the Web Map when selecting the circles (not visible at the current resolution) in the middle of the sections with mining claims. See e.g. NV Data Miner 2025a (entire).
[11] The C.L.A.I.M.S Web Map also allows users to select and view "Plans & Notices". See NV Data Miner 2025b (entire) for the plan being discussed.
[12] Based on information available on the Web Map when selecting the circles (not visible at the current resolution) in the middle of the sections with mining claims. See e.g. NV Data Miner 2025c (entire).

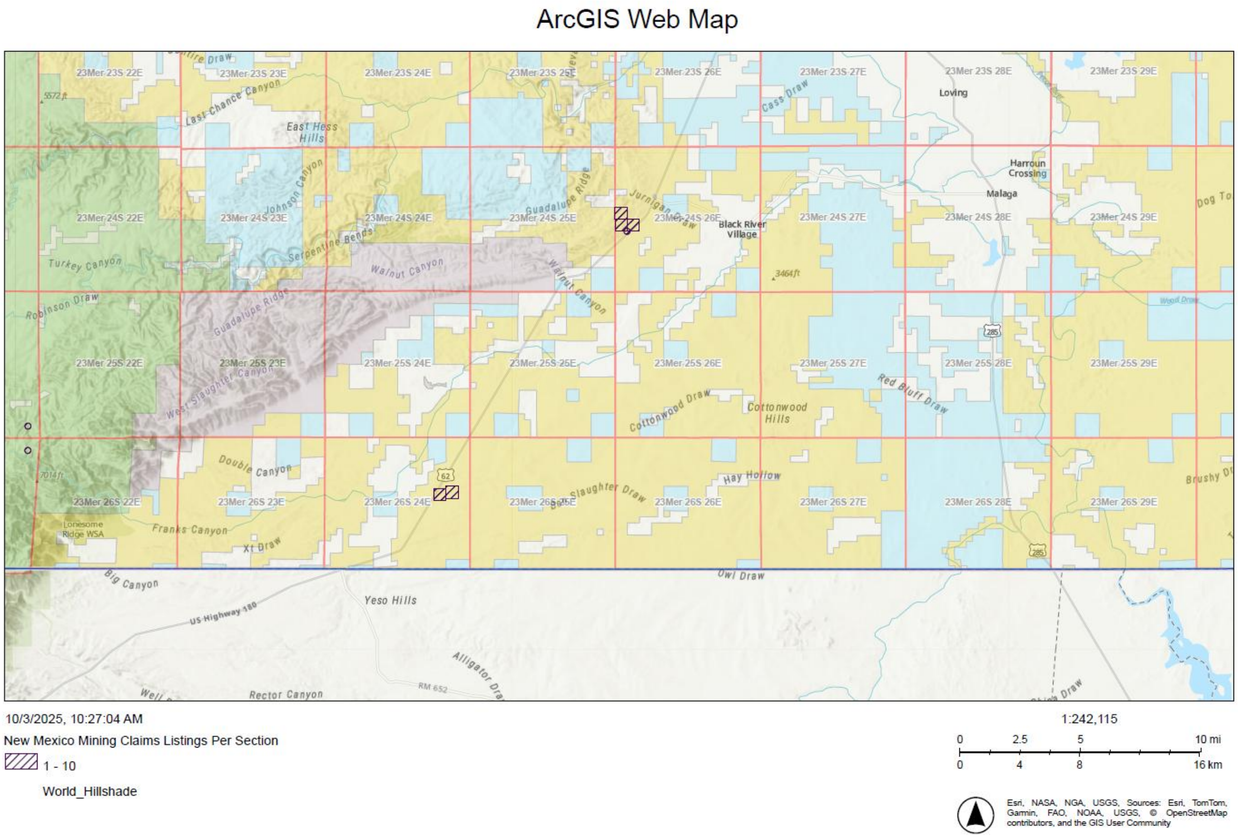

Figure 7. Active mining claims in or near *Linum allredii* habitat in New Mexico. Habitat is as modelled in Figure 2. Active mining claims correspond to active, filed and submitted claims mapped by the Claims Location Array Interactive Map Service (C.L.A.I.M.S.) using BLM Mineral & Land Records System data[13].

4. Herbicides

Herbicides can cause mortality of shrubs and shrub plants over large areas when applied at the landscape scale (Roth 2020 p. 10). At least one herbicide treatment has occurred near "modelled habitat" (Ibid), and it is likely that more will occur in the future since invasive plant species control is an ongoing activity in the BLM CFO planning area (BLM 2018a, p. 3-20, 3-21), and oil and gas fields are particularly susceptible to invasion (see section 1).

5. Recreation

[13] ArcGIS Web Map available at: https://experience.arcgis.com/experience/4a3b9406973e47d7aa5cf476500e7298/page/Page?views=Mining-Claims (accessed October 2025). For more details about the Web Map, see NV Data Miner 2021, p. 2.

Recreation impacts were reported by Roth (2020) to have been increasing within *Linum allredii* "modelled habitat" (Roth 2020, p. 11). Impacts include those associated with camping and off-road vehicle use during hunting, with camping impacts potentially also related to the relative lack of restrictions on public lands and proximity to two National Parks (Ibid).

B. Disease or Predation

Disease and predation are not known to be threats at this time, except in the context of livestock grazing (predation), discussed in section V.

C. Overutilization

Overutilization is not known to be a threat at this time.

D. Inadequacy of Existing Regulatory Mechanisms

1. BLM

The BLM lists *Linum allredii* as a sensitive species (BLM 2019, p. 3; Roth 2020, p. 9). The latter are species at risk of becoming listed under the ESA, and which the BLM "works to proactively conserve" and "ensure that activities on public lands do not contribute to the need for their future listing" (BLM 2025a, p. 3-4). Consistent with this policy, habitat for *L. allredii* has been modelled by the BLM for use in NEPA analyses (Roth 2020, p. 9), and their modelling helps inform our understanding of the potential distribution of the species. In 2017, the BLM also launched a seasonal field crew to set up long-term demographic monitoring plots for a select group of rare plants, including *L. Allredii* (Institute for Applied Ecology 2025, p. 5).

In regard to conservation on BLM lands, Roth (2020) further noted how the BLM CFO is preparing to finalize a revision of its Resource Management Plan (RMP), and that a "number of alternative natural resource conservation measures have been proposed in the RMP that could be of some benefit to the Yeso Hills area" (Roth 2020, p. 9). However, many, if not all, of these measures are expected to "be foregone in support of minerals development" and even if enacted "it appears that virtually all of the conservation measures proposed would have minimal ability to conserve sensitive resources. For example, many of the proposed ACEC [Area of Critical Environmental Concern] management decisions include withdrawal from the mining laws. Such withdrawals are expensive and technically complicated and require either Secretarial or Congressional approval. In practice, such withdrawals are rarely completed." (Roth 2020, p. 9).

The only current ACEC with any significant overlap with modelled habitat as depicted in Figure 2 is the Chosa Draw ACEC. However, this area (see BLM 2023, entire) corresponds to mostly low suitability habitat, and it is noted in Roth (2020) that although the ACEC would continue to be designated in the revised RMP, "management of the area could vary depending on the final decision" (Roth et al. 2020, p. 10). Furthermore, "Two new ACECs in the potential habitat are under consideration in the RMP, but actual designation of either is considered unlikely. Even if designated, the likelihood of adding planning decisions that actually protect the values for which the area was nominated is even more unlikely. No other protective areas exist or are expected to be designated in the foreseeable future" (Ibid).

Finally, the BLM recently proposed to rescind the 2024 Conservation and Landscape Health Rule. The proposed rule states that the 2024 rule "identifies conservation—a non-use—as a productive use for leases and permits. This is contrary to the BLM's mandate and statutory authority. Conservation is not a "use" under the statute […] the restoration and mitigation leases for which the Rule provides may preclude other uses of the public lands, running contrary to the notion of multiple use" (BLM 2025b, p. 43991). The proposed rescission rule also argues that the 2024 rule allows for temporary management of ACECs that interferes with productive use of the land, and places a heightened standard for de-designation of existing ACECs (Ibid).

2. State

The state of New Mexico includes *Linum allredii* on its endangered plants list, pursuant to Section 75-6-1 NMSA (New Mexico Statutes Annotated) 1978 and its implementing rule 19.21.2 NMAC (New Mexico Administrative Code) (EMNRD 2025, p. 1, 3). The criteria for inclusion on the list are having final or proposed protections under the ESA, or being a "rare plant across its range within the state, and of such limited distribution and population size that unregulated taking could adversely impact it and jeopardize its survival in New Mexico" (Ibid, p. 2). The NMAC prohibits (with some exceptions), the taking of endangered plants, meaning to "remove, harm, kill, destroy, possess, transport, export, sell, or offer for sale any of the plants, or parts thereof [...] from the places in the state of New Mexico where they naturally grow including federally owned land, private land, state owned land or land owned by political subdivisions of the state" (Ibid, p. 1-2). The State Forester may issue incidental take permits so long as the proposed activity does not "appreciably reduce the likelihood of the survival and recovery of the species in the wild" and best management practices and mitigation are utilized that "avoid, minimize and mitigate the impacts to the species" (Ibid, p. 4). However, the person conducting the proposed activity is not required to survey to determine the existence of endangered plant(s) (Ibid, p. 5), and while well-intended, state endangered plants protections have not prevented the extensive amount of oil and gas leasing in occupied and potential habitat combined with the presence of numerous new or active wells. Moreover, the state does not require designation of critical habitat.

3. Other

A seed banking and cryopreservation project that includes *Linum allredii* is currently underway (Institute for Applied Ecology 2025, p. 8). However, the success of the project is unknown, as is the species' translocation potential from seed, or the availability of funding for future translocations. Moreover, regardless of any challenges associated with ex-situ conservation, *L. allredii* still needs suitable habitat to survive in the wild, and as discussed above, reclamation of gypsum soils is difficult.

E. Other factors

1. Climate change

A description of historical and projected climate changes in New Mexico is given in Frankson and Kunkel 2022 (entire) and partially repeated in this section. Temperatures in New Mexico have increased more than 2°F since the beginning of the 20th century (Figure 8). The last decade has been the warmest on record in the state, and both extremely hot days and warm nights have trended upward over the past several decades (Frankson and Kunkel 2022, p. 1). Under a lower emissions pathway, annual average temperatures are projected to most likely exceed historical record levels by the middle of this century, and under a higher emissions pathway, historically unprecedented warming is projected during this century (Figure 8). It is also projected that heat waves will increase in intensity (Ibid, p. 3). Due to the projected increases in temperature, droughts in New Mexico are additionally projected to become more intense: while projected precipitation changes are uncertain, higher temperatures will increase water evaporation from moist and vegetated surfaces (Frankson and Kunkel 2022, p. 4). It is also projected that precipitation in spring, which is already the dry season, will decrease across most of the state (Ibid).

In Texas, temperatures have increased almost 1.5°F since the beginning of the 20th century (Figure 9), and historically unprecedented warming is predicted during the 21st century, with an associated increase in extreme heat events (Runkle and Kunkel 2022, p. 1). As further described in Runkle and Kunkel (2022), higher temperatures will lead to more soil moisture loss during dry spells, increasing the intensity of naturally occurring droughts (Runkle and Kunkel 2022, p. 1).

Both more intense drought conditions and higher temperatures may negatively impact the survival of *Linum allredii*. As discussed in Schuch 2021, plants take up water from the soil through the roots, with water subsequently moving through the plant into the leaves, where it is lost through stomata in a process known as transpiration. While the stomata are open, carbon dioxide enters the leaves for photosynthesis (Schuch 2021, p. 1). As further discussed in Schuch (2021), however, when water availability is low, such as during periods of drought, plants will attempt to resist the drought by using one or both of two general strategies: drought avoidance and drought tolerance (Schuch 2021, p. 2-3). In the first strategy, plants close their stomata to avoid water loss, but this also results in a cessation of photosynthesis and triggers the use of carbohydrate reserves for respiration to maintain metabolic processes and growth. If the drought is prolonged, the plant will die of carbon starvation as the energy use exceeds the energy produced by photosynthesis (Ibid, p. 2). In the second strategy, plants keep their stomata open and continue photosynthesizing, but at the risk of severe dehydration and potential cell death (Ibid). Low water content in plant tissue also limits the production of resins, and secondary metabolites, which usually protect against insects and pathogens (Ibid).

In addition to drought conditions, plants are vulnerable to increased temperatures, although as discussed above, the two often go hand in hand. According to Schuch 2021 (p. 2):

> Prolonged extreme high temperatures negatively affect cell function, growth, and survival (Fig. 1). Under high temperatures, water loss from plants and soil is accelerated due to higher rates of evapotranspiration. Higher temperatures, especially at night, lead to faster respiration rates and lower photosynthesis, depleting carbohydrate reserves faster than they are replenished. High temperatures alone, even in the absence of drought, can damage the photosynthesis system, resulting in cell injury with severe reduction in photosynthesis or cell death. In addition to starvation, plants may produce compounds such as reactive oxygen species, which can be toxic to the plant cell and cause further damage. Plants with greater heat tolerance produce heat shock proteins, allowing them to continue metabolic processes and photosynthesis, though at lower rates. Leaves and branches can be scorched, die and fall off, and eventually the entire plant will die.

While the extent to which *Linum allredii* specifically can tolerate increased drought and temperature conditions is unknown, the most recent 5-year review for Gypsum Wild Buckwheat (*Eriogonum gypsophilum*) is relevant here in that it relates to another gypsophile perennial plant in the BLM CFO planning area and includes analysis of the potential negative effects from climate change to the species (USFWS 2022, p. 5, 8):

> Climate change projections for gypsum wild buckwheat's range predict increased temperatures (+2–5 °C (+4–9 °F)), and relatively unchanged precipitation (+3.8 to -6.6 millimeters (mm) (+0.15 to -0.26 inches (in))) through 2099 under representative concentration pathway (RCP) scenarios 4.5 and 8.5, respectively. These changes would increase evaporation and drought, adversely affecting survival and recruitment of gypsum wild buckwheat plants. Gypsum wild buckwheat's tolerance of desiccation and ability to go dormant in response to soil moisture stress provides some resilience to climate change, but increases in the intensity, frequency, and/or duration of drought would likely stress this adaptive capacity. Increased drought may also lead to increased predation (Factor C) resulting from reduced availability of alternative preferred forage for herbivores. It is unknown if gypsum wild buckwheat's ability to obtain scarce nutrients and its strategies for surviving drought and herbivory can support self-sustaining wild populations through climate change (Service 2022, pp. 63–65).

(USFWS 2022, p. 7-8). Another plant which likely shares some similarities with *Linum allredii* in regard to its vulnerability to climate change is Tharp's bluestar (*Amsonia tharpii*), another perennial plant in the same general geographical area as *L. allredii* and dependent on gypsum soils (BLM 2018a, p. 3-5; Roth and Sivinski 2019, p. 2, 4). Surveys on federal and state land in New Mexico found an apparent decline in the number of plants between 2013/2014 and 2019 in all populations, and the effects of prolonged drought were noted as the likely reason (Roth and Sivinski 2019, p. 2, 22). "The drought of 2011 through the spring of 2013 apparently took a toll on the populations […] Although Tharp's bluestar was previously thought of as a hardy drought resistant suffrutescent perennial herb likely able to remain dormant through extended periods of drought (Sivinski et al. 2014), 2+ years of ongoing drought did result in significant mortalities. It is unclear whether populations will be able to recover from this decline or whether the decline is halted. What is clear is that mortality continues to significantly outpace recruitment" (Roth and Sivinski 2019, p. 22).

It is additionally important to note that drought will increase the occurrence and severity of wildfires in New Mexico, and the frequency of dust storms (Frankson and Kunkel 2022, p. 4). Wildfires may result in mortality of *Linum allredii*, in addition to increasing erosion of the soils (see BLM 2018a, p. 4-520) that the plants grow on. The impacts of dust storms on *L. allredii* are likely to be similar to those of fugitive dust, with Roth and Sivinski (2019) (p. 23) noting that dust may impact pollination success in Tharp's bluestar.

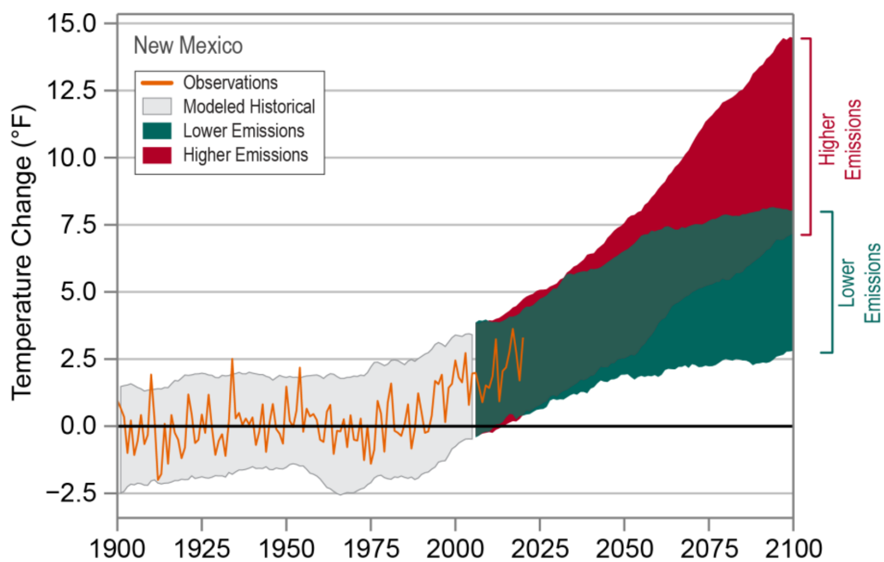

Figure 8. Observed and projected temperature changes in New Mexico. Adapted from Frankson and Kunkel 2022 (p. 1). Temperature changes depicted are observed and projected changes in near-surface temperature relative to the 1901-1960 average. Observed changes are for 1900-2020, and projected changes are for 2006-2100 from global climate models for two emissions scenarios: greenhouse gas emissions continue to increase (higher emissions) and greenhouse gas emissions increase but at a slower rate (lower emissions). The shading shows the range of annual temperatures from the set of models, with observed temperatures generally within the envelope of model simulations of the historical period (gray shading). Sources: CISESS and NOAA NCEI (Ibid).

VI. REQUEST FOR CRITICAL HABITAT DESIGNATION

The Center for Biological Diversity formally requests that the Service designate critical habitat for *Linum allredii* concurrently with listing as an endangered or threatened species, as required by the ESA (16 U.S.C. 1533(a)(3A)). Critical habitat as defined by Section 3 of the ESA is:

(i) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 1533 of this title, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and
(ii) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 1533 of this title, upon a determination by the Secretary that such areas are essential for the conservation of the species.

(16 U.S.C. 1532(5)).

Critical habitat should include all existing habitat of *Linum allredii* and areas with potential for recovery and determined to be important to the survival and recovery of this species.

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